

Supplementary Table 1. Characteristics of included studies

First author, Year	Country	Study period	Study design	Study setting	Sample size	Participants	Funding	Intervention	Outcome Measured	Study outcomes
Kolner 1986[40]	United States	Sept. 1985- March 1986	CBA	University	Intervention: 12 Control: 27	Medical students	NR	Instruction • Online modules vs. no instruction	Search skills	Students using modules scored significantly higher on post-test than students not using modules (dependent t test: $t=2.656$; $p=.01$; $df=37$)
McKibbin 1991[45] <i>Companion report:</i> Haynes 1993[37]	Canada	Sept 1, 1989 - June 29, 1990	RCT	Hospital	Intervention: 130 Control: 134	Clinical clerks, interns, residents, clinical scholars and fellows, and medical school faculty	U.S. National Library of Medicine and Ontario Ministry of Health	Instruction • Workshop + librarian feedback vs. workshop + no feedback	Search skills	Search performance for both intervention and control groups improved with average number of relevant references retrieved per search increasing from 4.5 to 7.4 ($p<0.01$) <i>Secondary outcome</i> • Satisfaction: 83% of the intervention felt their training was adequate compared to 69% of the control group
Klein 1994[39]	United States	Sept. 1989 - Sept. 1990	Cohort	Hospital	Intervention: 192	Physicians	NR	Literature searching as	Length of stay (LOS)	<i>Length of stay</i> [patients divided

					Control: 10,409			<p>a service</p> <ul style="list-style-type: none"> • Literature searches offered to clinicians • Cases associated with MEDLINE searches compared to those not receiving the service 	<p>and hospital costs/charges</p>	<p>into quartiles: 1-6, 7-14, 15=21, 21+ days]</p> <p>If a search was done later the LOS was more than double the LOS of the cases with the earliest searches (based on quartile for search: $F=4.7$, $p=.004$; based on coded length of stay: $F=10.53$, $p<.001$)</p> <p><i>Secondary outcome</i></p> <ul style="list-style-type: none"> • Cost <p>Cases with early searches (conducted during the first half of hospitalization) had significantly lower expenses: Early searches had a mean cost ratio of \$1.46 US (mean cost ratio calculated by comparing actual hospital costs of 192 test cases), later searches had a mean cost ratio of \$2.49 US</p>
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										($t=2.40$, $p=.003$). Average savings for early searches: \$7,379 US (year not reported – estimated as US 1994 dollars)
Frasca 1992[34]	United States	Fall 1990	CBA	University	Intervention: 48 Control: 44	Medical students	NR	Instruction • Critical appraisal course including literature searching vs. no course	Search skills	Intervention group scored significantly higher on library skills: <i>Intervention group</i> : mean=2.53 (SD 1.23) <i>Control group</i> : mean=1.05 (SD 0.89) $p<0.001$ Critical appraisal <i>Intervention group</i> : mean=7.38 (SD 2.44) <i>Control group</i> : mean=4.55 (SD 2.12) $p<0.001$
Erickson 1998[33]	United States	October 1, 1994 - June 30, 1995	RCT	Hospital	Intervention1 : 11 Intervention2 : 12 Control: 8	Residents	NR	Instruction • MEDLINE tutorial vs. no formal MEDLINE training	Search skills	No statistically significant difference in compliance with instructions, search duration, number of articles retrieved, recall rates, precision

										<p>rates between groups</p> <p><i>Secondary outcome</i></p> <ul style="list-style-type: none"> • Satisfaction: 100% of participants felt the tutorial improved their searching skills
Gruppen 2005[36]	United States	2001-2003	CBA	University	<p>Intervention: 30</p> <p>Control: 40</p>	Medical students	Grant-U.S. Centers for Disease Control and Prevention	<p>Instruction</p> <ul style="list-style-type: none"> • MEDLINE search training session in the context of evidence based medicine vs. no training 	Search skills	<p><i>Intervention Group</i></p> <p>Search Quality Score:</p> <p>Pre-intervention 59.8 (SD 25.5);</p> <p>Post-intervention 72.5 (SD 21.3)</p> <p><i>Control Group</i></p> <p>Pre-intervention: 60 (SD 21.1);</p> <p>Post-intervention: 59.3 (SD 16.9)</p> <p>Post-intervention Mean Difference: 13.2 (95% CI: 4.1,22.3) $p<.05$</p> <p>Change: 13.4 (95% CI: 2.3, 24.5) $p<.05$</p>
Van Moorsel 2005[48]	United States	2002	CBA	University	<p>Intervention: 179</p> <p>Control: 48</p>	Allied health students	NR	<p>Instruction</p> <ul style="list-style-type: none"> • Health informatics 	Search skills	<p><i>Intervention group</i></p> <p>Mean post-test score significantly greater than mean</p>

								course including literature searching instruction vs. no course		pre-test score (Paired t test analysis: $t=14.868$ $p<.001$)
Bradley 2002[26]	United States	Not stated	RCT	Hospital	Intervention: 5 Control: 5	Residents	University of Michigan Medical School (Medical Education Scholars Program)	Instruction • Librarian provided one-on-one search instruction and advice vs. no individualized instruction	Search skills	<p>Average search score (using a scale of 1 to 5 with 1 identifying the highest [best] score):</p> <p><i>Intervention group</i></p> <ul style="list-style-type: none"> • pre-intervention: 3.0 • post-intervention: 3.3 • 6 months post-intervention: 2.0 <p><i>Control group</i></p> <ul style="list-style-type: none"> • pre-intervention: 3.5 • post-intervention: 3.4 • 6 months post-intervention: 3.8 <p><i>Secondary outcome</i></p> <ul style="list-style-type: none"> • Satisfaction: The control group expressed less satisfaction with search retrievals and demonstrated

										more errors in technique
Koufogiannakis 2005[41]	Canada	September 2003 - October 2003	RCT	University	<p>Intervention: 6 groups (approx. 9 students/grp)</p> <p>Control: 12 groups (approx. 9 students/grp)</p>	Medical and dental students	NR	<p>Combination of instruction/literature searching as a service</p> <ul style="list-style-type: none"> • Addition of a librarian to small Problem-Based Learning groups vs. no librarian support to small Problem-Based Learning groups 	Exam scores	<p>There was no statistically significant difference found between intervention and control groups on final exam scores ($p=0.13$), the medical information portion of questions on the exam ($p = 0.37$), or their final grade for the course ($p=0.08$).</p>
Lechner 2007[42]	United States	2003-2004 academic year	NRCT	University	<p>Intervention: 17</p> <p>Control: 10</p>	Students in occupational or physical therapy	NR	<p>Instruction</p> <ul style="list-style-type: none"> • Interactive, Web-based CINAHL tutorial vs. lecture led by librarian about the CINAHL database 	Search skills	<p>Students completing the tutorial (intervention B) demonstrated greater improvement in post-test scores than those attending the lecture (intervention A):</p> <p>Pre-test Grp A: 54.5%</p>

										Grp B: 48.9 % Post-test Grp A: 62.6% Grp B: 67.0 % % change: Grp A: 8.1% Grp B: 18.1%
Cheng 2003[30] <i>Companion report:</i> Cheng 2004[31]	Hong Kong	Not stated	RCT	Hospital	Intervention: 257 Control: 287	Clinicians	NR	Instruction • 3 hour workshop in literature searching vs. no workshop	Problem solving	<i>Intervention group</i> 21 minutes (average time per session); 92.0% (success in problem solving) <i>Control group</i> 35.3 minutes (average time per session); 63.9% (success in problem solving) Statistically significant: $p=0.000$ Clinical question formulation: significant difference ($p=0.000$) in the number of components (PICO) in questions identified by the

										<p>intervention (average 3.16 concepts) and the control group (average 2.49 concepts)</p> <p><i>Secondary outcome</i></p> <ul style="list-style-type: none"> • Satisfaction: 96% of intervention group were satisfied with the workshop
Banks 2007[25]	United States	Aug 2004-Mar 2005	Cae-Control	Hospital	<p>Intervention: 55</p> <p>Control: 136</p>	Residents	NR	<p>Literature searching as a service</p> <ul style="list-style-type: none"> • Information service offered by librarian during morning round vs. no information service 	<p>Length of hospital stay for patients (in days)</p>	<p>Intervention: median=3.00 days; mean=6.85 days (SD 10.18)</p> <p>Control: median=5.00 days; mean=7.22 (SD=5.67)</p> <p>$p=0.0238$</p> <p><i>Secondary outcomes:</i></p> <ul style="list-style-type: none"> • Relevance of answers provided: 43 (out of 105) house officers indicated that articles positively influenced patient management

										<ul style="list-style-type: none"> • Cost: <i>Intervention</i> Total charges per hospitalization: Mean=\$15,142.88 US, SD \$22,401.40 <i>Control</i> Mean=\$14,951.40 US, SD \$13,312.03 (no statistical significance) [2007 US dollars]
Mulvaney 2008[46]	United States	August 2004 - March 2006	RCT	Hospital	Intervention: 108 Control: 118	Physicians, fellows, residents, and nurse practitioners	National Library of Medicine	Literature searching as a service • Librarians provided clinical informatics consult service vs. no service	Impact on clinical decision-making	Evidence provided by the service primarily impacted the use of a new or different treatment (OR 8.19 95% CI 1.04 – 64.00)
Chen 2009[29]	United States	Academic year: 2005-6 to 2007-8	NRCT	University	Intervention A: 141 Intervention B: 147 Control: 141	Medical students	Partial funding: 1) AAMC Western Group on Educational Affairs educational research grant; 2)	Instruction • Information retrieval and management workshop vs. no workshop	Search skills	<i>Number and completeness of citations</i> Percentage without citations Intervention A: 9.3% Intervention B: 11.0% Control: 14.0% ($p < .05$)

							UCSF Biomedic al and Health Sciences Internship for High School			<p>Percentage of citations with complete documentation: Intervention A: 64.9% Intervention B: 61.0% Control: 29.4% ($p<.05$)</p> <p>Frequency of citing primary articles: Intervention A: 24.7% Intervention B: 13.2% Control: 18.8% ($p<.05$)</p> <p><i>Secondary outcome:</i> • Satisfaction: Students and facilitators rated librarian visit to be of limited usefulness for improving students' research/literature skills (students: 2.79, SD 1.20; facilitators 2.79, [43]SD 1.12)</p>
Eldredge 2008[32]	United	August 2005 -	RCT	Public	Intervention:	Public health	National	Instruction	Frequency	No statistical

	States	February 2006		Health	42 Control: 33	professional (including administrators, disease prevention specialists, epidemiologists, health educators, nurses, nutritionists, physicians, program directors, and social workers)	Library of Medicine	<ul style="list-style-type: none"> Workshop on evidence based medicine including PubMed training vs. delayed training session (2 week delay period allows comparison of no training) 	and sophistication of participants' practice-related questions	significance between intervention and control group for: 1) number of questions generated 2) sophistication of questions
McGowan 2008[43] <i>Companion report:</i> McGowan 2012[44]	Canada	October 2005 and April 2006	RCT	Hospital	Intervention: 1417 Control: 472	Physicians	Ontario Ministry of Health and Long Term Care Primary Health Care Transition Fund	Literature searching as a service <ul style="list-style-type: none"> Rapid response to clinical questions by librarians during patient visit hours vs. no response 	Time (t1) taken to respond to questions and 2) cost savings (time to locate information, workload, and additional healthcare resource use)	Time: <i>Intervention group</i> Time: 13.68 minutes/question (95% CI, 13.38 to 13.98) <i>Control group</i> Time: 20.29 minutes/question (95% CI, 18.72 to 21.86) <i>Secondary outcome</i> <ul style="list-style-type: none"> Satisfaction: 86% (n=62) rated their level of satisfaction with the service as having a positive

										<p>impact on the care they provided to their patients</p> <ul style="list-style-type: none">• Relevance of answers provided: 83% assessed the service as providing relevant information to their questions in an appropriate time frame• Cost:<ul style="list-style-type: none">1) Cost savings per question : \$10.58 (2006 CDN)2) Cost avoidance savings (eg. ordering less imaging tests): \$0.97 (2006 CDN)3) Additional number of patients that can be seen per year = 24 <p>Average cost savings and cost avoidance for each question with the service estimated at \$11.55 CDN (year not reported – estimated as 2008 CDN)</p>
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										<p>dollars)</p> <p>Average salary cost for librarian to respond to a question=\$7.15 CDN (based on 15 minutes)</p> <p>Average salary cost for a physician to respond to question (based on 15 minutes) range= \$20.75-\$27.69 CDN (year not reported: estimated as 2008 CDN dollars)</p>
Carlock 2007[28]	United States	February 2006-Spring 2007	Cohort	University	<p>Intervention: 60</p> <p>Control: 30</p>	Nursing students	NR	<p>Instruction</p> <ul style="list-style-type: none"> • Additional instruction on literature searching vs. no additional instruction 	Search skills	<p><i>Intervention group</i></p> <p>First performance assessment</p> <p>Range: 0%-100%</p> <p>Mode: 50%</p> <p>Second performance assessment Range: 40%-100%</p> <p>Mode: 100%</p>
Gardois 2011[35]	United Kingdom	October 16-24, 2007; October 25 – December 27, 2007	RCT	Hospital	<p>Intervention: 9</p> <p>Control: 9</p>	Residents and interns	Ricerca Sanitaria Finalizzata - 2006	<p>Instruction</p> <ul style="list-style-type: none"> • Assisted search session related to a clinical scenario vs. 	Search skills	<p><i>Intervention group</i></p> <p>Median score: 73.6 points</p> <p>Interquartile range: 13.4</p> <p><i>Control group</i></p> <p>Median score:</p>

								non-assisted search session		<p>50.4 Interquartile range: 17.1</p> <p>Difference between median values in the results: 23.2 points (95% CI 4.8–33.2) in favour of the intervention group ($p=0.013$)</p>
Brettle 2013[27]	United Kingdom	Started: March 2008 - Unclear when the study period concluded	RCT	University	Intervention: 18 Control: 16	Nursing students	NR	<p>Instruction</p> <ul style="list-style-type: none"> • Online in-house information literacy tutorial vs. one hour face-to-face session 	Search skills	<p>Searching skills improved for online or face-to-face teaching of same materials ($p=0.001$) and remain unchanged 1 month later.</p> <p>There is no improvement or degradation of skills 1 month post-session for either method ($p=0.216$).</p>
Aitken 2011[24]	Canada	January 26 - July 26, 2009	Cohort	Hospital	Intervention: 34 Control: 16	Residents and clinical clerks	NR	<p>Combination of instruction/literature searching as a service</p> <ul style="list-style-type: none"> • Librarian assigned to 	Impact on clinical decision-making	<p>Changing a treatment plan based on skills taught by librarian (intervention): 30 of 34 (88%)</p> <p>Changed a treatment plan</p>

								clinical team vs. no librarian assigned to clinical team		based on the librarian mediated search support (control): 27 of 34 (79%)
Ilic 2012[38]	Australia	Not stated	RCT	Hospital	Intervention: 60 Control: 37	Medical students	NR	Instruction • 2-hour EBM literature searching skills workshop vs. no training	Search skills	No statistical mean difference in literature searching skills between the participants who attended the formal workshop and participants who did not (mean difference=0.007, $p=0.99$). <i>Secondary outcome</i> • Satisfaction: 70% of all participants agreed that workshop was effective in improving their literature searching skills
Rosenberg 1998[47]	United Kingdom	Not stated	RCT	University	Intervention: 38 Control: 44	Medical students	NR	Instruction • 3 hour training sessions vs. no training session	Search skills	Training improved intervention group performance ($p<.0001$) <i>Secondary outcome</i> • Satisfaction:

										96% (n=55) stating the sessions were extremely or very useful
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